

ABSTRACT OF THE DISCLOSURE

A method and apparatus are provided for rapid production of high-strength metal structures. A computerized model of the structure is created, then the model is sliced into horizontal layers. A computer-controlled gantry controls the location of a roller in at least three axes (x, y, and z), the roller depending from the gantry. An electron or laser beam melts the end of a metal wire, forming a puddle of molten metal near the roller. Coordinates defining each layer of the model of the component are sent to the gantry, which moves the roller over the puddle to create a uniform-thickness layer, the wire feeding additional metal to be melted by the beam as the gantry moves. The puddle is narrow, typically requiring multiple narrow strips to be laid adjacent each other to form a complete layer. When a layer is completed, additional layers are formed on the first layer, and this process repeats until the structure is completed.